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# GRAFTING VINIFERA VINEYARDS

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For various reasons, growers often wish to change the variety of grapes which they are growing. There are two ways of doing this. One is to dig up the old vines and plant new. The other is to graft over the old vines with the desired variety.

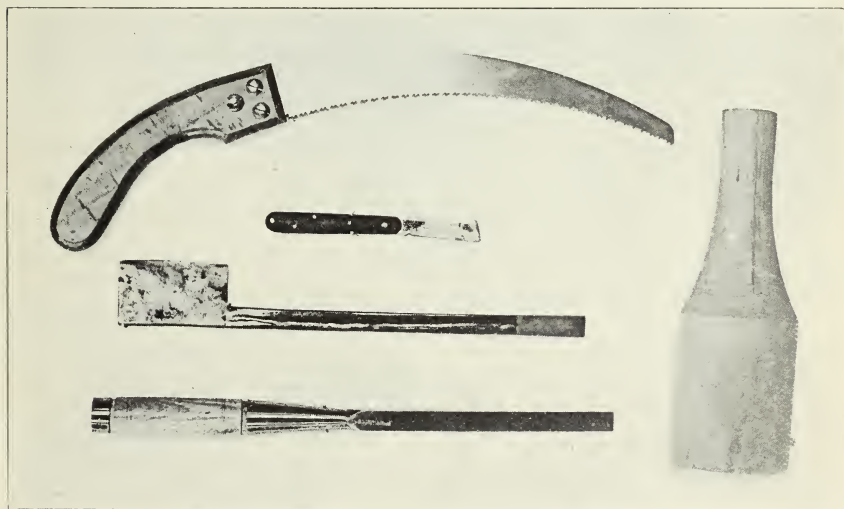


Fig. 1

TOOLS FOR GRAFTING VINES

As a rule it is a mistake to follow either of these courses. If the price of one kind of grape is low now, by the time the change is made, the new kind may have fallen in price and the old one be more profitable. In any case, there is considerable expense and loss of time and material, which only very considerable improvement in crop and price will compensate. There are, however, some cases where a change of this kind is advisable, and at all events there is always somebody ready to take the risk, and it is desirable to make this risk as small as possible by doing the work properly.

Grafting may also be used to change undesirable varieties in mixed blocks. Scattering wine grapes in a vineyard of shipping or raisin grapes are wasted or are expensive to harvest. These can be best utilized by grafting with the variety of which the block is mainly composed.

*Two Kinds of Grafting.*—Most of the late publications on grafting vines refer to grafting *Vinifera* varieties on American or phylloxera resistant stocks. This differs in several important respects from the grafting of one *vinifera* variety on another, which we are now considering, and methods suitable for one case would be defective for the other.\*

*Age of Vines.*—*Vinifera* vines may be grafted at any age, but there is seldom anything to be gained by grafting vines less than 2 or 3 years old. For younger vines, it is usually cheaper and better to dig up and replant, if a change is necessary. Very old vines (12 years or over), if they are sound and straight below the soil, may be grafted successfully. Such grafted vines, however, are usually short-lived. The large wounds and the great amount of wood which decays often make unhealthy vines. In deep, loose, dry soil the stumps of such vines may be removed entirely and the grafts inserted in the roots. This requires great skill, however, and the percentage of failures is always large. Vines of from three to eight years are the most easily and successfully grafted.

*Choice of Scions.*—Preparations for grafting should be commenced early by choosing good healthy mother vines bearing good crops from which to take the cuttings to be used as scions.

As late grafting is usually the most successful, it is desirable to keep the scions dormant as long as possible. For this purpose the cuttings should be taken from the vines when their activities for the season have completely ceased and those of the next season have not commenced. Wait, therefore, until all the leaves have fallen off the mother vines for one or two weeks. Any time from this until a month before the swelling of the buds is suitable.

Cuttings taken within a week or two after the fall of the leaves are the best. The cuttings should be carefully selected and only good sound canes of medium size, with eyes neither too close nor too far apart should be used.

*Conservation of Scions.*—It is convenient to make the cuttings long enough for 2 scions, allowing 2 extra eyes for waste. This length will be from 14 to 24 inches, according to variety and the length of scion used. The cuttings should be made up into small bundles of 50 to 100

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\* For grafting resistant vines see Bull. 180, "Resistant Vineyards."

and stored in a cool and moderately dry place. The best way is to put them into pits or trenches under an open shed, and cover them completely with very slightly moist sand. Any shady place where there is no danger of too much moisture getting to the cuttings may be used, such as under a dense tree, the north side of a building, a cellar, etc.

*Season for Grafting.*—The best time for grafting depends somewhat on the soil and the climate, but usually the latest grafts do the best, providing the scions are completely dormant and otherwise in good condition. If the buds of the scions have started and the bark become loose, many will fail.

In well drained, sandy soil, the time for successful grafting extends from January to May in most localities, but March for the earlier and April for the later localities are usually the best months. In stiffer and wetter soils, much greater care is necessary in choosing the time for grafting. The soil should be in such condition that it will pulverize easily, and the heavy rains should be over. Lumpy soil placed about the graft will cause many failures, and a heavy rain which leaves the soil water-logged around the union for several days may kill all of them.

It is best in all cases when possible to wait until the buds commence to swell on the vines to be grafted, and grafting may continue until the shoots are several inches long or longer.

*Preparation of the Stock*—More grafts fail from an excess of moisture than from drying out. This moisture may be already in the soil, or due to rains after grafting, or it may simply be due to the sap which flows out of the cut stump. The amount of sap that will flow out of a vine 2 or more inches in diameter is very considerable and quite sufficient in many cases to “drown” the graft. This may be avoided by cutting off the vines 1 or 2 days before grafting and leaving them exposed to the air, in order that the main flow of sap may dry up. This is good practice in all cases where the vines are over 1½ inches in diameter.

*Methods of Grafting.*—Many methods have been recommended and used for old vines, but the ordinary cleft graft is the easiest, and if done under proper conditions will give a practically perfect stand.

*Tools Necessary.*—The only special tools needed are a curved pruning saw, a grafting or budding knife, a wooden maul, and a strong ½-inch chisel, unless the vines are very large, that is, over 3 inches in diameter. In this case, it is well to have a grafting tool made. Any blacksmith can make a good one from an old horseshoe file. This tool should be 14 inches long and about ⅝ of an inch in diameter. At one end it should be flattened out into a hatchet shaped

blade 3 inches long and 2 inches wide. This blade should be about  $\frac{3}{8}$  of an inch thick on the back, gradually tapering to a sharp edge. The other end of the tool should be shaped like a cold chisel about  $\frac{5}{8}$  of an inch wide. This cold chisel edge should be in the same plane as the hatchet edge and not at right angles to it as is sometimes made. (See fig. 1).

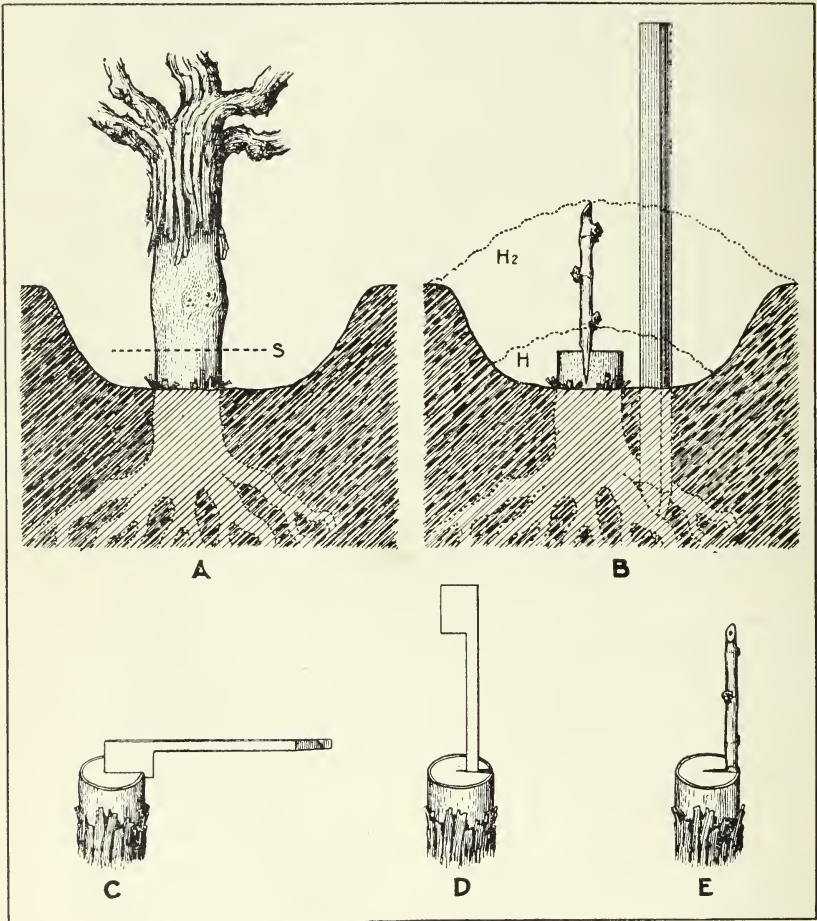


Fig. 2

A convenient receptacle for holding the scions is made by cutting a coal oil can horizontally through the middle and placing a round stick across the top for a handle. This will hold 50 or more scions, and by putting an inch of water in the bottom, they can be kept perfectly fresh.



*Preparation of the Scions.*—Proper care of the scions is necessary for the best results. If the cuttings have been made and kept properly, they will show, on being cut, clear greenish white wood, green inner bark, and firm, dry, light-brown pith. If the pith is black or water-soaked, the wood streaked or spotted with black, or the bark loose or brownish, the cuttings have been injured by too much moisture or they were poor cuttings to commence with, and should not be used.

A cutting which is too dry is harder to detect by its appearance. If suspected of being too dry, they may be tested by placing 2 or 3 short pieces of 2 or 3 buds in moist sand in a warm room. If in a week, they do not show signs of life by the starting of the roots at the bottom or the swelling of the buds, they are unsafe to use.

Twenty-four hours before they are needed, the cuttings should be taken out of the sand in which they have been stored and washed to remove all particles of sand which would blunt the grafting knife. They should then stand in fresh water for 1 or 2 days, but not more, until used.

*Method of Operating.*—The first thing to do is to clear away the earth from around the base of the vine, making a pit about 2 feet in diameter and 2 to 3 inches deeper than the level at which the grafting is to be done. The earth should be well cleaned off the stem of the vine and the rough dry bark removed (see A, fig. 2). The vine is then ready for decapitation. This is done by sawing horizontally in such a place that about 2 inches of smooth, straight grain are left at the top (See S, fig. 2). If the sawing is done at or too near a place where the grain of the wood is crooked or curly, great difficulty will be found by the grafter in making a good fit.

After leaving the decapitated vine about 24 hours to bleed, it is ready for the insertion of the scion. If the vines are  $1\frac{1}{2}$  inches in diameter or less, one scion to each vine is sufficient. An attempt to put in more will usually result in having 2 badly fitting grafts in place of 1 good graft. For larger vines, 2 scions are preferable whenever they can both be made to fit securely. If both of these scions grow, the weaker is removed at the next pruning. In making the cleft, a place should be chosen where the bark is smooth, straight and sound. The cleft should be made by splitting, not by cutting. First place the edge of the knife or grafting tool on the part of the sawed surface where the cleft is to be made, and which has been previously cleaned and smoothed with the grafting knife. With a slight blow of the wooden mallet the edge is driven about  $\frac{1}{8}$  of an inch into both wood and bark (See C, fig. 2). The object of the mark thus made is to insure that the bark and the wood split at the same place. The chisel

or the chisel end of the grafting tool is then placed on the mark sufficiently far from the bark to allow of the insertion of the scion and then driven in an inch or so, sufficient to open a cleft wide enough to allow the entrance of the scion (See D, fig. 2). The opening of the cleft is accomplished by pressing the chisel sideways. The scion is inserted and then, when the chisel is released and removed, the tension of the wood will hold the scion firmly in place (See E, fig. 2).

The cleft, whenever possible, should not extend quite across the vine. If the cleft extends only part way, it will close up more completely and hold the scion more firmly. With small vines, it is often impossible to avoid splitting quite across, and it may then be necessary to tie the scion in by putting 2 or 3 turns of thin string or raffia around the stock. With large vines, the pressure is occasionally too great, and sufficient to crush the scion. This is obviated by placing a small wedge of wood immediately behind the scion.

*Shaping the Scions.*—The scion is cut in the ordinary wedge form, a little thicker on the side which comes nearest to the bark. The length of the wedge depends on the character and size of the cleft in the stock. The wedge will usually be long and tapering. It is inserted in such a way that the line between the bark and wood coincide with the corresponding line on the stock. As the bark of the stock is thicker than that of the scion the outer surface of the scion will be a little lower than that of the stock. It is not always possible to make the lines correspond exactly, but perfectly satisfactory unions are obtained if these lines were very near together or cross in one or two places.

The cutting of the scion should be done with a very sharp, clean knife, and its insertion in the stock should be immediate, before it has a chance to become dry even on the surface. It is bad practice to prepare the scions beforehand.

*After the Scion is Set.*—As soon as the scion is in place, all cut surface of stock and scion should be carefully covered with a couple of inches of moist, well-pulverized soil (see H, fig. 2), and a stake driven in such a position that it will support the first growth of the graft. The complete filling of the hole may be deferred for a few hours, except in extremely hot, dry weather, but not long enough to run any risk of having the scion become even slightly dry. No wax, clay or similar material is needed. There is nothing better to put around the union than moist, loose soil. This gives the conditions of moisture and aeration most favorable to the uniting of the tissues. It is a good practice to cover the cleft in the stock with a little clay, a

leaf, or anything that will exclude the soil, but unless the cleft is large, this is not necessary. The filling up of the hole with soil should be complete and the whole scion may be covered up unless the soil has a tendency to bake. When finished, each graft will be in the middle of a wide mound of soil (See H<sub>2</sub>, fig. 2). Narrow mounds may become too dry.

*Length of Scion.*—It is usual to use scions of two buds, but there is often advantage in having them longer. Three and even more, buds have been used with advantage on large vines. With only 2 buds on such vines the growth is often so rapid and so large as to be almost unmanageable. With several buds, it is sometimes possible to obtain 5 or 6 bunches of grapes the first year, which, if the variety is early, will ripen sufficiently for wine-making.

*After Treatment of the Grafts.*—The proper management of the grafts during the first growing season is as important as the grafting itself.

The mounds should not be disturbed by hoe or cultivator until the unions are well formed. If the scions are completely covered and the mounds form a hard crust, this crust should be carefully broken with the fingers.

*Suckering.*—Many large, vigorous shoots will come up from the old stock. If these are left too long, they will choke or dwarf the graft. If they are removed too soon, many good grafts will be disturbed and killed by injuring the unions. Judgment and careful work are therefore needed in suckering. When the grafts have started to grow vigorously, so that the shoots can be tied to the stake, it is safe to commence suckering. The suckers can usually, at this time, be removed in bunches by pulling up by the hand without removing any soil. Unless it is quite certain that the suckers are not entangled with the scion, some soil must be carefully removed until it is possible to see how to detach the suckers without disturbing the union.

Where grafts are slow in starting, and the suckers vigorous, it is necessary to sucker before the scion has grown much. This can be done safely if care is used.

*Tying Up the Shoots.*—When the union is complete, the growth of the grafts on large vines is generally very rapid. A growth of 2 or 3 inches a day, and many canes 10 to 15 feet long on a vine at the end of the season, is common. Unless this vigorous growth is properly managed its benefits are not only lost, but it gives great trouble the following year and makes it impossible to obtain a properly shaped, healthy vine. If the canes are left to themselves they will often grow flat on the ground, and as they may be 1½ inches thick or more by the

end of the season, the attempt to raise them up the next year will result in many of the finest grafts being torn out of the stock, and the rest will make ill-shaped vines, weakened by numerous large wounds.

The shoots should therefore be tied to the stake with a loose piece of string or thin rope as soon as they are long enough. If too many shoots start, they should be thinned. This thinning should be done early, in order to throw all the available strength and growth into the shoots left. One shoot to each bud is enough on strong vines, and one shoot to a graft on weak or small vines.

When the shoots left have grown 2 or 3 feet, they should be cut back 6 inches or so, in order to force out laterals. The laterals which start below 8 or 10 inches from the base of the shoot should be pinched off when small, but all laterals above that allowed to grow. The new vine is thus completely formed the first season, the main shoot forming the trunk of the vine and the laterals the 2, 3 or 4 branches. Such a vine may produce almost a full crop the following year.

The cost of grafting over an old vineyard properly will in all cases be considerable, and will seldom be less than \$25 per 1000 vines above the ordinary cost of cultivation, and without reckoning the cost of stakes and the loss of crop. With large vines, the cost may considerably exceed this.